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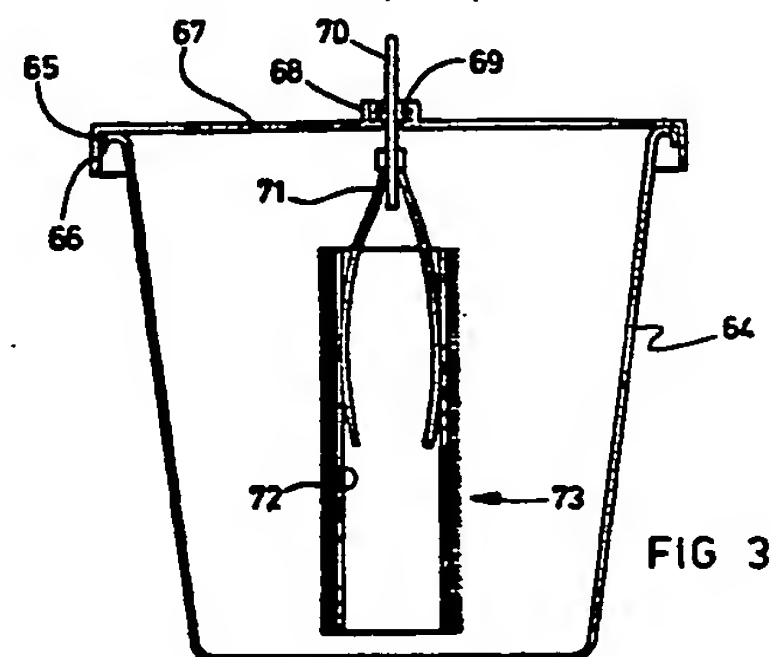
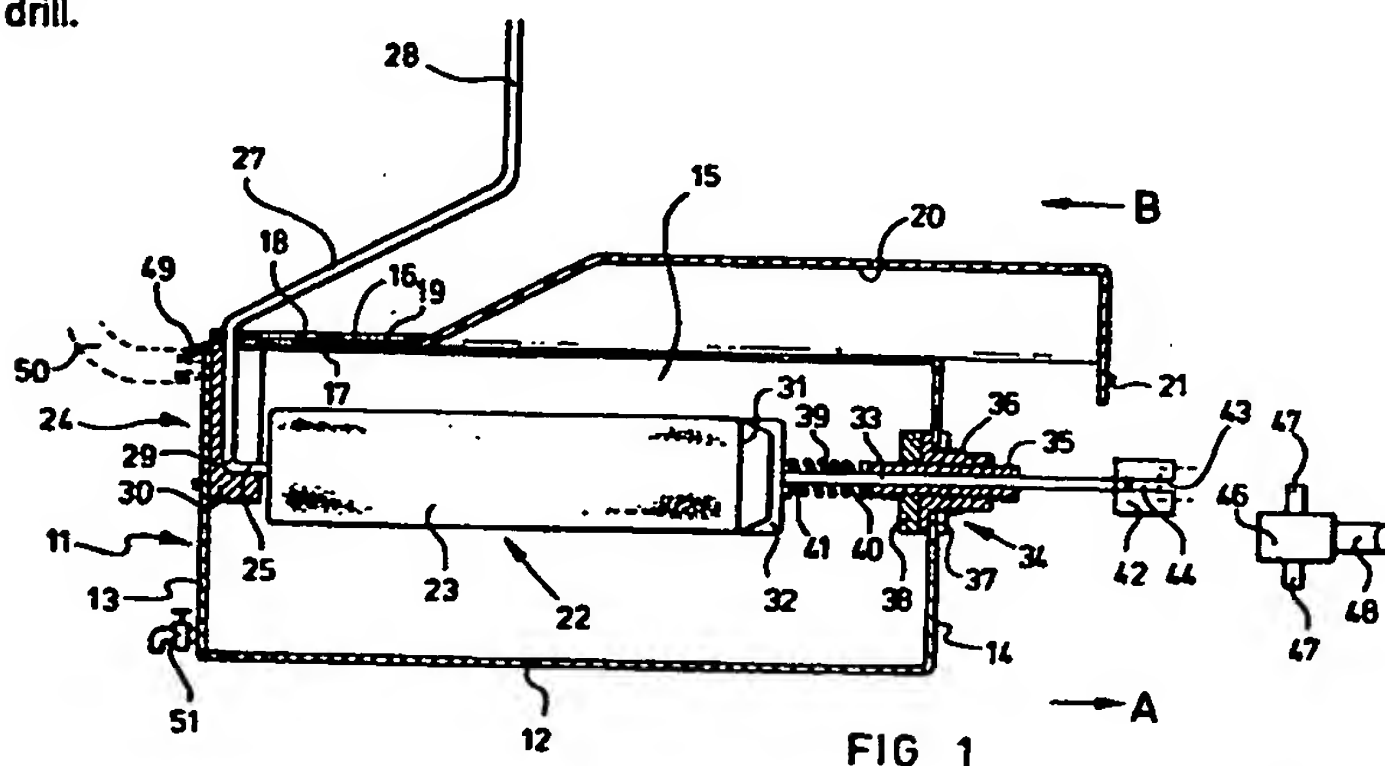
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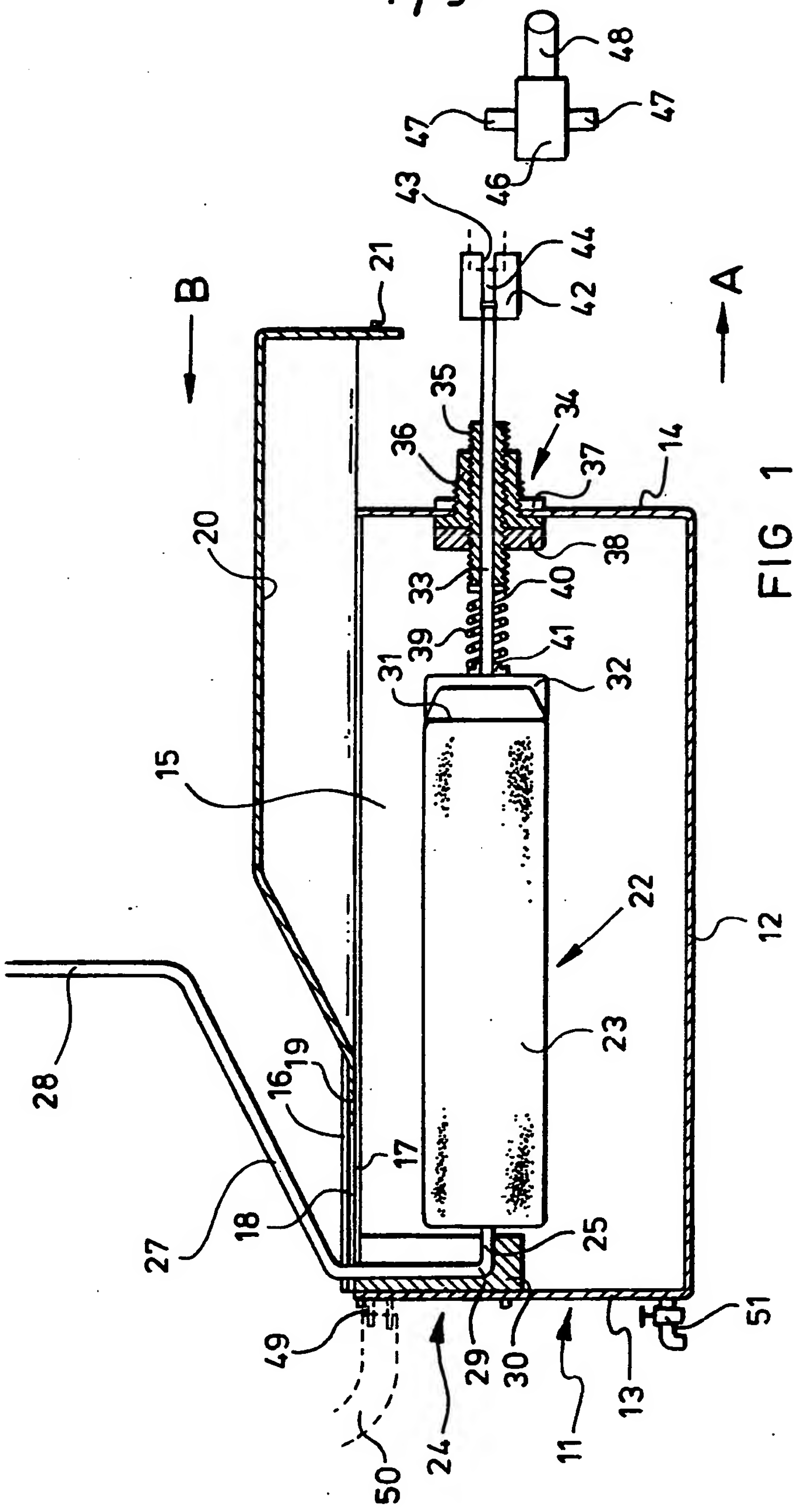
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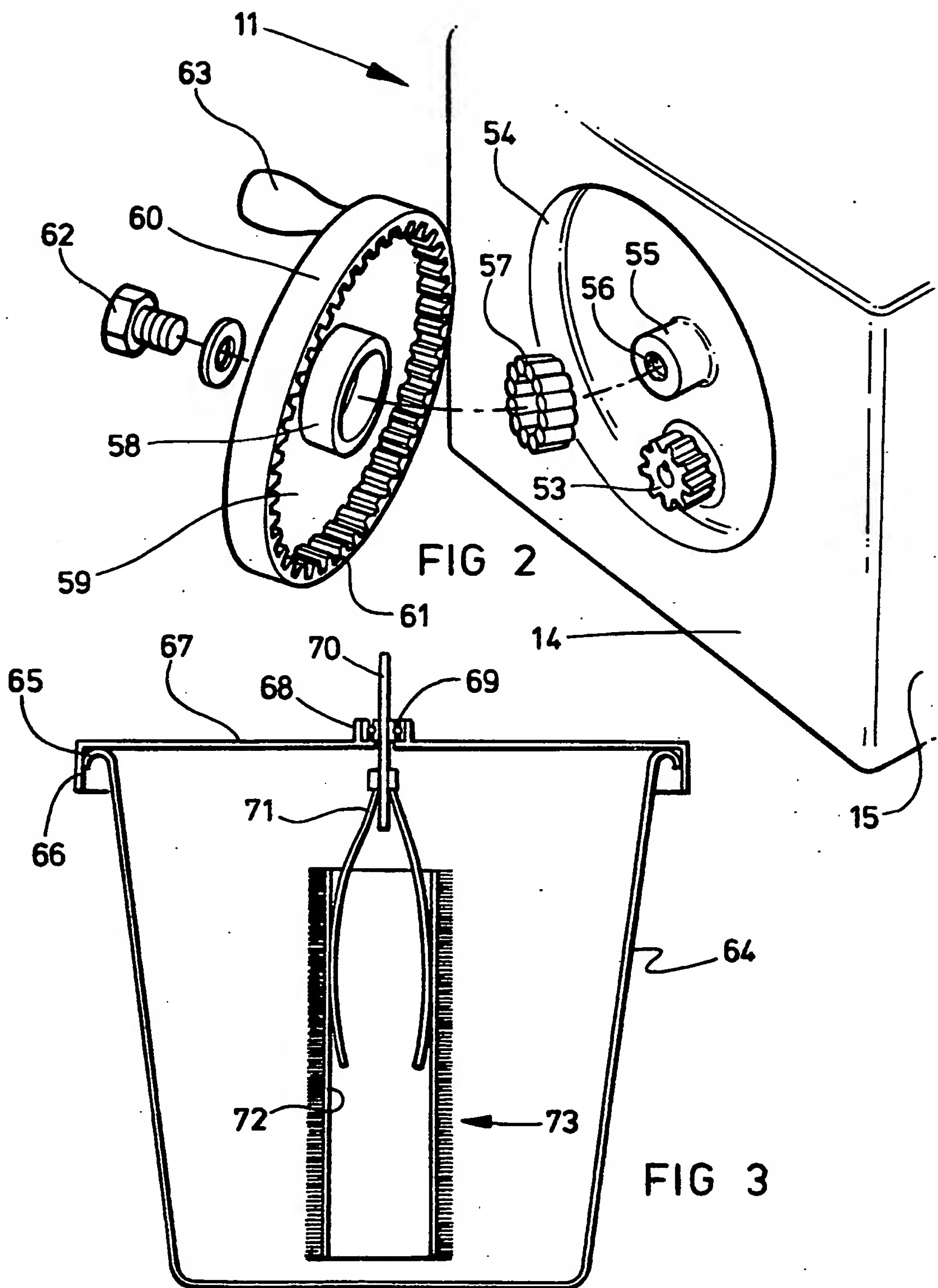
## (54) Paint roller cleaning equipment

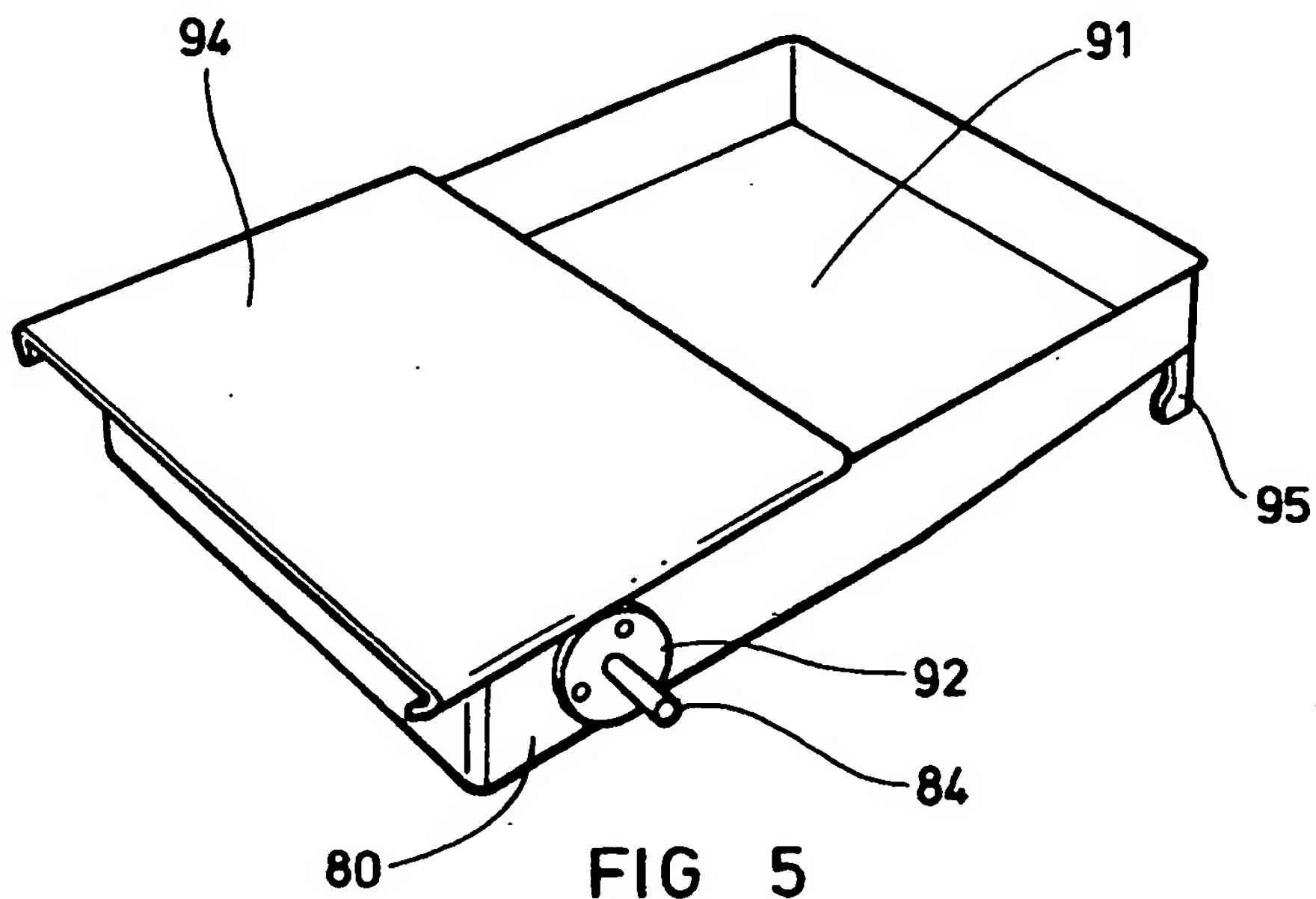
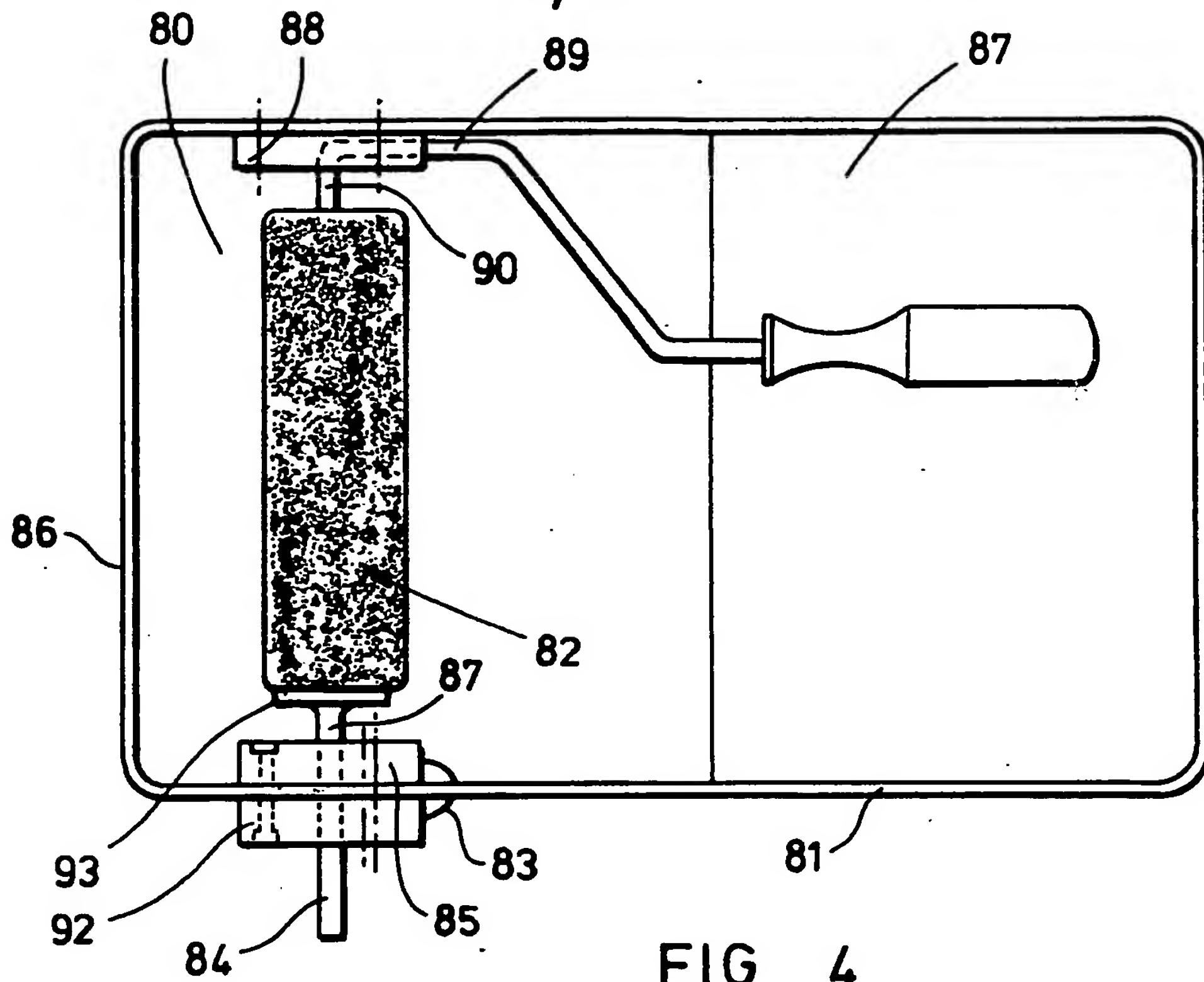
(57) Paint roller cleaning equipment comprises roller supports 30, 32 and a mechanism for rotating the roller at high speed so as to remove centrifugally a major proportion of the liquid content of the roller. The mechanism may comprise a spindle 33 provided with a coupling 42 engageable by member 46 which may be rotated by an electric power drill, gearing and a manually-rotatable handle, or a spindle 70 provided with resilient arms 71, the spindle being rotatable by an electric power drill.



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IMPROVEMENTS IN OR RELATING TO CLEANING APPARATUS

The present invention relates generally to cleaning apparatus, and particularly to apparatus for cleaning a paint roller.

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Paint rollers have been available for some considerable time and are known to produce a good finish when used on paintwork, especially when using emulsion paint over relatively large areas. Paint rollers are generally easy to use, extremely effective and produce a good finish. One of the reasons why their use has been, in general, restricted to relatively large areas of paintwork is that it is both time consuming and troublesome to clean the surplus paint from the absorbent layer which constitutes the outer surface of the paint roller. Paint rollers would be used more readily and extensively if there were easier and quicker ways of cleaning the paint from this absorbent surface layer, but hitherto cleaning techniques have involved repeated washing and draining of the roller to dilute the paint successively until the paint contamination of the absorbent surface layer is negligibly small.

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The prior art includes a paint roller cleaner in the form

of an enclosed container having a water inlet with a distribution manifold having a plurality of jets directing incoming water onto a rotatably mounted roller which can turn slowly, under the impact of the impinging water jets, whereby gradually to dilute and wash out the paint contaminating the absorbent surface. This known paint roller cleaner has a water inlet and a permanently open water outlet so that the roller is continually turned by the impact of the jets on freely rotatable bearings with a lower part of the roller immersed in a liquid bath within the container. The liquid bath may be water in the case of emulsion paint or a solvent in the case of paints requiring cleaner other than water. The use of such known prior art cleaner is extremely tedious and time consuming even though it is less troublesome than manual techniques since it takes some considerable time of continuous running for the paint entirely to be washed out of the roller and although the operator does not require to maintain constant supervision it is nevertheless necessary for him to bear in mind that the roller cleaning operation is taking place so that the water supply can be turned off and the roller removed from the container and placed to drain after a sufficient time period has elapsed.

The present invention seeks, on the other hand, to provide paint roller cleaning equipment which is both fast acting so that the operator does not have to engage in the paint roller cleaning operation for an extended period of time, and which also acts to clean the paint from the roller very effectively in a short space of time and which furthermore is easy to use and less troublesome than conventional paint cleaning operations whilst at the same time being less time consuming than the prior art paint cleaning apparatus described above.

According to one aspect of the present invention, therefore, apparatus for cleaning a paint roller comprises means for supporting the roller for rotation about its axis and means by which the roller can be rotated at a sufficiently high speed whereby centrifugally to discharge a major proportion of the liquid content of the roller.

Using the apparatus of the invention, then, it is only necessary for sufficient water to be added to the paint to dilute the quantity of paint in the absorbent surface layer and then, by driving the rotation of the roller at high speed, the dissolved paint is centrifugally thrown from the roller leaving it almost perfectly clean. A

second operation of diluting the remaining content of paint and a second centrifuging operation will reduce the paint content to such a low level as to be to all intents and purposes practically as good as new. This can be achieved in a matter of a few minutes with the centrifuging operation taking only a few seconds (for example in the region of 10 to 15 seconds) and results in the roller being practically dry as well as clean at the end of the operation so that, from a tradesman's point of view, it is possible simply to store the roller in a bag or container without requiring to protect other contents of the tradesman's bag from the moisture which would otherwise be contained in the roller.

In one embodiment of the invention there are further provided shroud means for shrouding the roller to intercept spray centrifugally discharged therefrom. This interception of the spray may also include collection and discharge thereof to a suitable drain. The shroud means may comprise, for example, a container which is also usable to contain a rinsing liquid for diluting the paint on the absorbent layer of the roller surface.

Alternatively, however, the shroud means may be formed as a two part structure comprising a first generally planar



support, including bearing means for one end of the roller, and a second part in the form of a generally cylindrical or tapering cylindrical casing part. The roller may be cleaned, using an embodiment of this nature, by introducing it into a rinsing vessel  
5 containing a solvent liquid (water in the case of emulsion paints) and then subsequently removed therefrom and placed into the second part of the shroud (it being appreciated that the first part of the shroud, forming the support for the bearing, will already be carrying the  
10 roller at one end. It is envisaged that the roller may be suspended from a bearing on the first part of the shroud with its axis substantially vertical and, when placed into the generally cylindrical or tapering cylindrical casing part (again with its axis vertical)  
15 may be rotated at high speed whereby centrifugally to eject the dilute paint absorbed in the absorbent surface layer of the roller. In such an embodiment the said second part of the shroud means may conveniently be a conventional bucket or pail and the first part of the  
20 shroud may incorporate a peripheral axial lip or flange which can fit over the rim of the bucket or pail whereby to form an adequately sealed housing to prevent the escape of centrifugally ejected spray.

The means by which the roller can be rotated at a sufficiently high speed centrifugally to expel liquid therefrom preferably comprises a spindle having attachment means at one end for engagement on one end of the paint roller and means at the other end for  
5 attachment of a drive motor such as an electric pistol drill. The attachment means for the pistol drill may simply comprise a plane end of the spindle adapted to be gripped by the chuck of the pistol drill, but preferably includes a bayonet-type coupling at the said other end of  
10 the spindle for engagement with a cooperating coupling member which can be attached to the chuck of the pistol drill. Coupling the drill to the paint roller cleaning equipment is thus a simple plug-in action which, because  
15 it is used in conjunction with water-containing apparatus, is likely to be more satisfactory and provide a higher degree of safety against contact of the drill by water.

In an alternative embodiment the means by which the  
20 roller can be rotated at a sufficiently high speed to cause centrifugal ejection of the liquid comprises a manually turnable gear mechanism. Such an embodiment avoids the necessity for the use of an electric drill and  
25 in this respect is simpler and easier to use.

The said manually turnable gear mechanism may comprise a ring gear turnable about a first axis offset from the axis of rotation of the roller mounts, and a driven pinion having fewer teeth and a smaller diameter than the ring gear and mounted for rotation with the said roller mounts. The driven pinion is preferably rotatable about an axis aligned with the roller mount axis and may, indeed, be mounted on a spindle common with that on which the roller is mounted.

The above mentioned ring gear may have internal or external teeth although a construction utilising internal teeth allows the greatest primitive pitch diameter to be employed within a given space and consequently allows the greatest step-up ratio between the drive and driven gears. Such a ring gear may be formed as a cup-shape cover with teeth on the inside of the rim of an axial peripheral flange thereof so that enclosure of the drive mechanism is simple and achieved with few components. A central boss on the ring gear cup having an axial hole for a fixing bolt then allows the cover to be secured in place to complete the drive mechanism.

There are currently available two basic types of paint

roller, namely a first type in which a framework or cage of frame members is mounted between two pivotable end supports for carrying a removable sleeve in the form of a rigid cylindrical former around the outside of which is carried a surface layer of absorbent material. Such a paint roller allows the paint-soaked absorbent roller sleeve to be removed and replaced with another for immediate continuation of work with a different colour: the sleeve may also be removed for cleaning purposes and in this case it is unnecessary to make provision for accommodating the paint roller handle which extends beyond one end of the roller sleeve itself. The second type of paint roller incorporates a foam or fleece sleeve integrally formed with the roller itself, which is not removable from the handle and for cleaning which it is necessary to make provision for accommodation of the handle. In an embodiment of the invention adapted for such a paint roller the spindle mounts are carried in a casing and include a fixed seat for the roller handle and a coupling for engaging the end of the roller opposite that from which the handle extends. Hereinafter the end of the roller opposite that from which the handle extends will be referred to as the "free end" of the roller whereas the other end will be referred to as the "handle end".

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5 The coupling for the free end of the roller may be formed  
as an axially biased support engageable over or against  
the free end and in a preferred embodiment the drive  
spindle itself is axially biased and carries a cup-shape  
coupling member at the inner end thereof for engagement  
with the free end of the roller. Of course, an  
embodiment of the invention such as this adapted for the  
non-separable type of paint roller may equally be used  
10 with a paint roller having a removable sleeve although,  
with such an embodiment, it is not necessary to remove  
the sleeve to effect cleaning.

15 Embodiments of the invention may also be formed as a  
container for housing a bath of liquid within which the  
paint roller may be rotated for cleaning purposes and in  
such an embodiment inlet and outlet means at a high and  
low level respectively may be provided so that washing  
water and used washing water can be allowed in and  
withdrawn from the container without the need for  
20 tipping. In the simplest embodiments, of course, the  
water may simply be introduced direct from a tap and  
tipped after use down a drain through an upper opening.

25 Various embodiments of the present invention will now be

more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is an axial sectional view of a first embodiment of the invention;

Figure 2 is an end view, partly exploded, of a second embodiment of the invention;

Figure 3 is an axial sectional view of a third embodiment of the invention;

Figure 4 is a plan view from above of a further embodiment of the invention, formed as a paint tray; and

Figure 5 is a perspective view of the embodiment of Figure 4.

Referring now to the drawings, and particularly to Figure 1 thereof the embodiment shown comprises a generally rectangular elongate casing 11 having a flat bottom wall 12, upright end walls 13, 14 at opposite ends of the base wall 12 and two opposite side walls 15 (only one of which is visible in Figure 1 since it is a sectional view).

The side walls 15 are formed with inwardly projecting parallel lips 16, 17 defining an elongate slot 18 extending along the length of the container 11 for receiving a planar peripheral flange 19 of a cover 20

which is slidable between the two parallel slots 17. At its free end the cover 20 has a downwardly extending terminal flange 21 which, when the cover 20 is closed, overlaps the free end wall 14 to prevent spillage of water from the container as will be described in more detail below.

Within the container 11 there are formed two mounts for a paint roller generally indicated 22 comprising a cylindrical roller body 23 carried on an arm 24 which, as is conventional with paint rollers, has a first part 25 extending parallel to the axis of rotation of the roller body 23, a second part 26 extending perpendicularly to the first part 25, an inclined support limb 27 and a handle portion 28 which extends perpendicularly to the spindle portion 25 and the line of which intersects the spindle bearing arm 25 approximately mid-way along the roller body 23. The spindle bearing portion 25 meets the second part 26 at a right angle elbow 29 and, as can be seen from Figure 1, this elbow is supported in a mounting block 30 attached to the end wall 13 of the casing 11 which has a suitably shaped recess for this purpose. The opposite end of the roller body 23, identified with the reference numeral 31 is supported by a coupling member in the form of a cup 32 carried at one end of a spindle 33

which passes through the end wall 14 of the casing 11 and is borne in an adjustable bearing 34 constituted by an externally threaded sleeve 35 which is engaged in a threaded opening in a flanged bush 36 held in an opening in the end wall 14 by a clamp nut 37. Adjustment of the threaded sleeve 35 with respect to the flanged bush 36 can be made by turning the sleeve 35 with respect to the bush about its longitudinal axis and any adjusted position can be retained by means of a lock nut 38.

Around the end of the spindle 33 between the inner end of the threaded bush 35 and the coupling member 32 is located a compression spring 39 engaged at one end on a rotatable bearing washer 40 which is turnable with respect to the inner end of the threaded sleeve 35, and at the other end on a shoulder fixing boss 41 which is non-rotatably fixed to the spindle 33 and to the cup-shape engagement member 32. When the spindle 33 is rotated, therefore, the cup-shape engagement member 32 rotates with it and the biasing arrangement comprising the shouldered boss 41, the compression spring 39 and the thrust washer 40 also turn with it and with respect to the threaded sleeve 35. At its free end the spindle 33 is fitted with a coupling member 42 in the form of a cylindrical body non-rotatably mounted on the spindle 33.



and having a central cavity 43 and a transverse slot 44. The coupling member 42 is engageable by a bayonet coupling member 45 having a cylindrical body 46 the diameter of which is a sliding fit within the cavity 43 and two transversely projecting pins 47 which engage in the slots 44. The coupling 45 has a spindle 48 engageable, for example, by the chuck of a pistol drill to be driven to rotate.

Finally, the end wall 13 of the container 11 is provided with a spigot 49 for an inlet hose 50 and an outlet drain tap 51. In use of the cleaning equipment described above a paint roller 22 is fitted into the container 11 by withdrawing the spindle 33 by applying a tension in the direction of the arrow A of Figure 1 so that the cup-shape engagement member 32 is drawn towards the end wall 14 increasing the axial distance between itself and the mounting block 30. A paint roller 22 may then be fitted into position with the elbow 29 of the handle arm being engaged into the mount 30 following which a release of the axial tension of the spindle 33 will allow the spring 39 to extend until the cup-shape engagement member is pressed against the free end of the roller body 23. These operations are performed with the cover 20 withdrawn somewhat further beyond the partly open

position illustrated in Figure 1. The cover 20 may then be closed by moving it in the direction of the arrow B of Figure 1 until the flanged end 19 is positioned over the upper edge of the end wall 13. For this purpose the end flange 19 is provided with a notch (not illustrated) which allows the second part 26 of the roller support arm to enter such that the majority of the length of the end wall 13 is covered by the end flange 19 of the cover 20.

Water is then introduced through the inlet tube 50 and the casing 11 can be lightly agitated to cause the water to wash over the roller body 23. The tap 51 is then opened to allow the dilute paint solution to drain away and a pistol drill fitted with the coupling 45 by engagement of the spindle 48 in its chuck can then be engaged onto the coupling body 42 and the drill energised. This will cause the spindle 33, and consequently the coupling body 32 and the paint roller body 23 to rotate at high speed throwing off any dilute paint remaining on the absorbent lining of the roller body. When the drill is allowed to stop the tap 51 can be again opened to allow any small quantity of liquid within the container to drain away and then by sliding the cover 20 open, in the direction of the arrow A of Figure 1, the paint roller can be removed simply by

lifting the handle 28 to raise the elbow 29 out of the seat in the mount 30: the coil spring 39 will then extend to take up its natural position displacing the engagement cup 32 in the direction of the arrow B of Figure 1 until the natural length of the coil spring 39 is re-established. In most cases it will be found that the roller is adequately cleaned by this process. Should the paint be less than usually soluble in water (or other solvent liquid if such is used, for example if the paint roller has been used with oil paints) the whole operation may be repeated with a fresh charge of water and without necessarily removing the paint roller from the mounts within the casing 11. The whole operation takes only a few seconds which compares very favourably with the very considerable amount of time taken for cleaning a paint roller by conventional techniques.

Turning now to Figure 2 an alternative embodiment is shown, in part, which corresponds largely to that of the embodiment of Figure 1 but with the exception that the spindle 33 instead of being slidably housed within a bush 35 as in the embodiment of Figure 1, is fixedly mounted on a bearing carried by the end wall 14 of the container 11 and the cup-shape member 32 (not shown in Figure 2) is resiliently biased with respect to the spindle by means

of a simple coupling, for example having two flats on the spindle and an oval hole in the coupling member. At the end of the spindle projecting through the wall 14 there is fitted a pinion 53 which is housed eccentrically within a shallow recess 54 formed in the end wall 14 either within its thickness or by embossing as shown in Figure 2. A central boss 55 with a threaded opening 56 projects from the centre of the recess 54 and serves as a radially inner guide track for a ring of rolling bodies 57 which guide an outer ring 58 formed as an inner axial peripheral rim of a cup-shape body generally indicated 59 which constitutes a combined cover and drive gear for the pinion 53. The cup-shape body 59 has a peripheral axial rim 60 with a plurality of inwardly directed teeth 61 forming a ring gear, and a central hole (not shown) through which a set screw 62 may pass to secure the body 59 to the boss 55 by threadedly engaging in the hole 56. Finally, the cup-shape body 59 has an eccentric handle 63 by which it can be turned about the axis of the boss 55. When so turned the teeth 61 of the ring gear engage the teeth of the pinion 53 and therefore cause the spindle to rotate at high speed. As illustrated in Figure 2 there is a 5:1 ratio between the drive gear and the driven gear so that if the handle 63 is rotated at about 200 rpm the roller body within the casing will be rotated at 1000 rpm

which is quite fast enough to exert a very significant centrifuging action. In this respect it is noted that commercial spin drying machines for clothing operate in the region of 800 to 1100 rpm and that this speed range should be achievable by the hand drive mechanism  
5 described. Much greater speeds are, of course, achieved by electric drills which, typically, rotate at 3000 rpm.

Turning now to Figure 3 the simpler alternative embodiment illustrated is specifically adapted for use  
10 with paint rollers of the type having a removable sleeve, and the embodiment illustrated comprises a conventional bucket or pail 64 having a tapering cylindrical side wall and a flanged rim 65 over which fits an axial peripheral  
15 flange 66 of a generally flat support body 67 having a central boss 68 housing a ball bearing 69 supporting a central spindle 70 the upper end of which is left as a plane shaft to be gripped by the jaws of a pistol drill chuck and the lower end of which is formed with a spring  
20 cage 71 which can engage on the interior cylindrical surface of a cylindrical former 72 of the sleeve 73 of a paint roller. In this embodiment the support member 67 fits loosely over the flange 65 of the bucket 64 with its own axial peripheral flange 66 forming an adequate shield for spray centrifugally ejected from the paint roller  
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sleeve 73 when this is rapidly rotated for example by means of a pistol drill. This embodiment may be used simply by attaching the pistol drill to the free end of the spindle 70 and the paint roller sleeve 73 to the connecting cage 71. The paint roller sleeve 73 may then be dipped into a water bath, for example a second bucket containing a sufficiently large quantity of water completely to immerse the sleeve 73 when it is placed in it, and additional mechanical rinsing action may be achieved by slightly agitating the sleeve 73 within the water bath by holding the pistol drill and moving this to and fro, or by rotating the paint roller sleeve 73 by energising the pistol drill for short periods. Then the assembly may simply be lifted from the water-containing bucket with the operator still holding only the pistol drill, held for a moment whilst the surplus water drains from the roller and then, having been placed in the bucket 64 the pistol drill is energised for a period of 10 to 15 seconds to allow centrifugal action to spin the sleeve substantially dry. If the paint roller sleeve is not entirely clean after this process it may be repeated with a fresh charge of water or cleaning solvent.

In a further embodiment (not illustrated) provision is made for the drum containing the water to be rotated

about a vertical axis as well as the spindle 70 with the operator having the choice of rotating both the drum and the paint roller sleeve or the paint roller sleeve alone by appropriate adjustments to the mechanism.

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In another embodiment, not illustrated, adapted for cleaning a paint roller without removing it from the handle, whilst nevertheless orientating the roller itself with a vertical axis as in the case of the embodiment of Figure 3, employs a cylindrical vessel having a cover with an offset drive spindle bearing a drive wheel engageable by frictional contact with the cylindrical surface of a roller held with its axis vertical within the container. Suitable means for holding the roller by the handle at one end are provided so that, when the drive wheel is turned, it causes the roller to turn in a manner similar to that use for driving a speedometer from the side of a bicycle tyre. The drive wheel may be rotated by a manual drive system or by an electric motor or the like. In another embodiment (not illustrated) the roller is engaged by a belt to be rotated within the washing liquid. Again, as in the embodiment of Figure 3, the roller axis is held vertically within a generally cylindrical container.

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Turning now to Figures 4 and 5, the further embodiment illustrated is formed in such a way that it can also be used as a paint tray in the same way as a conventional paint tray. In this embodiment an upwardly open container 80 of rectangular outline with upstanding side walls is formed with an inclined ramp 91 extending over a portion of its floor area. As with conventional paint trays, a quantity of paint can be introduced into the container 80 and in order to apply paint to the roller the roller body 82 is partly immersed into the paint in the container 80 and then rolled over the inclined ramp surface 91 to distribute the paint uniformly over its surface, squeezing out surplus paint which can then run down the ramp back into the container.

When the painting operation is completed the excess paint in the container 80 is removed and replaced with a solvent and the roller positioned on mounts on the side walls of the container as illustrated in Figure 4. The mounts comprise a fixed block 88 having a groove for receiving the end of the spindle 90 which, as is conventional with paint rollers, is bent also to form the handle 89. At the other end the roller body 82 is supported by a spindle 87 rotatably mounted in a spindle mount 92 and carried in a bearing 85 which is rotatable



with respect to the mount 92 and which allows axial movement of the spindle 87 to bring an enlarged head end 93 thereof into contact with the end of the roller body 82. The spindle 87 may be resiliently biased in a manner similar to that of the embodiment of Figure 1 to engage the end of the roller body 82, and has a free end 84 for engagement with a drive motor such as a pistol drill.

To prevent spray from the roller body 82 from escaping during high speed rotation thereof a cover 94 which has an in turned flange for engagement over a lip 81 of the container 80 so that it can be positioned and removed by sliding. The operation of this embodiment to clean a roller is as described in relation to the earlier embodiments.

CLAIMS

1. Apparatus for cleaning a paint roller of the type comprising a generally cylindrical absorbent rotatable roller body carried for rotation by a handle member, comprising means for supporting the paint roller for rotation of the roller body about its axis in position on the handle member, and drive means for rotating the roller body with respect to the handle member at a sufficiently high speed whereby centrifugally to discharge at least a major proportion of the liquid content of the roller.

2. Apparatus as claimed in Claim 1, in which there are further provided shroud means for shrouding the roller to intercept spray centrifugally discharged from the roller.

3. Apparatus as claimed in Claim 2, in which the shroud means comprises a container also usable to contain a rinsing liquid for diluting the paint on the roller surface.

4. Apparatus as claimed in Claim 2 or Claim 3, in which the shroud means is formed in two parts comprising a first generally planar support including bearing means

for one end of the roller, and a second part in the form of a generally cylindrical or tapering cylindrical casing.

5        5.        Apparatus as claimed in Claim 4, in which the said second part of the shroud means is a bucket.

10       6.        Apparatus as claimed in any preceding Claim, in which the means by which the roller can be rotated at a sufficiently high speed centrifugally to expel liquid therefrom comprises a spindle having attachment means at one end for the absorbent paint roller body and means at the other end for attachment of a drive motor such as an electric pistol drill.

15       7.        Apparatus as claimed in Claim 6, in which the attachment means for the pistol drill includes a bayonet-type coupling at the said other end of the spindle.

20       8.        Apparatus as claimed in any of Claims 1 to 5, in which the means by which the roller can be rotated at high speed comprises a manually turnable gear mechanism.

25       9.        Apparatus as claimed in Claim 8, in which the said

manually turnable gear mechanism comprises a ring gear turnable about a first axis offset from the axis of rotation of the roller mounts, and a driven pinion having fewer teeth and a smaller diameter than the ring gear and mounted for rotation with the said roller mounts.

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10. Apparatus as claimed in Claim 9, in which the driven pinion is aligned with the roller mount axis.

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11. Apparatus as claimed in Claim 9 or Claim 10, in which the ring gear has internal teeth.

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12. Apparatus as claimed in any of Claims 9 to 11, in which the ring gear is formed as a cup-shape cover with teeth on the inside rim of the axial peripheral flange.

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13. Apparatus as claimed in any of Claims 9 to 12, in which the central boss on the ring gear cup has an axial hole for a fixing bolt.

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14. Apparatus as claimed in any of Claims 9 to 13, in which the spindle mounts on the casing includes a fixed seat for the roller handle and a coupling for engaging the roller free end.

15. Apparatus as claimed in any preceding Claim, in which the coupling between the roller body and the said drive means includes an axially biased support.

5 16. Apparatus as claimed in any of Claims 6 to 15, in which the drive spindle is axially biased and carries a cup-shape coupling member at the inner end.

10 17. Apparatus as claimed in any of Claims 2 to 16, in which the said shroud is formed as a paint tray with mounting means thereon for means for rotatably supporting the said roller body.

15 18. Apparatus as claimed in Claim 17, in which the paint tray is provided with a shaped cover removably attachable thereto.

19. Apparatus as claimed in Claim 17 or Claim 18, in which the cover is slidably removable therefrom.

20 20. Apparatus substantially as hereinbefore described with reference to and as shown in the accompanying drawings.